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Seeking legitimacy and learning: an exploration of KTOs' engagement with associations to improve knowledge exchange

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ABSTRACT

Knowledge Transfer Offices (KTOs) play a central role in enabling technology and knowledge sharing. While the literature has extensively explored their institutional and organizational characteristics, their engagement in associations that support knowledge exchange remains underexplored. These associations, which we define as Knowledge Exchange Associations (KEAs), are crucial actors that foster KTOs' development by providing access to resources, learning opportunities, and institutional visibility. Drawing on interorganizational relationship literature, this study investigates how KTOs' engagement with KEAs evolves over time, and which mechanisms drive such evolution. We present a longitudinal case study of Netval, the Italian KEA for research valorization, relying on multiple sources, including interviews, archival data, and direct observations. Our findings identify two main drivers of KTOs' engagement in KEAs (i.e., building legitimacy and searching for learning) and show how they vary across three evolutionary phases of the KEA: aggregation, consolidation, and impact.

1. Introduction

Technology and knowledge sharing are well-consolidated priorities for universities and public research organizations (PROs), as well as for the competitive advantage of companies and the development of countries. Thus, over the past 30 years, the public research system has been strengthening its capacity to valorize research results, namely, to transfer knowledge to the marketplace and generate a positive impact on society (Alexandre et al., 2022; Nafari et al., 2024). Knowledge transfer offices (KTOs)[1] play a relevant role in such a process by enacting various policies and strategies. The scholarly literature has mostly analyzed KTOs in terms of their institutional and organizational characteristics to better understand and assess their role in the valorization process (Siegel et al., 2003; Patsali, 2024).

The activities of KTOs are complex and challenging. On the one hand, KTOs face the opportunity to operate at the international level and create a portfolio of connections to maximize the likelihood of the successful valorization of knowledge produced by their universities or organizations of affiliation (Guerrero and Pugh, 2022). On the other hand, KTOs operate within specific academic and research settings with several (and sometimes conflicting) objectives, administrative complexities, and serious budget constraints (Siegel et al., 2003; Brantnell and Baraldi, 2022), forcing them to find nontrivial managerial solutions for effective and widely shared valorization processes. Furthermore, KTOs influence and are influenced by ever-evolving external dynamics regarding national and international regulations, trends, funding schemes, laws, and support mechanisms. However, they are often imbued within regional innovation ecosystems. Their operations are affected by local dynamics, the availability of other physical infrastructures (including incubators, science parks, start-ups, innovation agencies, venture capitalists, and corporates), and a plethora of actors operating within their territories (Belitski et al., 2019). In other words, KTOs experience a tension between the ambition and the necessity to operate on a higher scale and reach out to larger audiences, and the useful (albeit something excessively strong) rooting within given organizational boundaries and within local territories and their ecosystems.

Within this context, KTOs feel the pressure to be part of broader networks and create interorganizational relationships that can facilitate

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[1] With the term KTO, we refer to organizational units within universities and PROs that institutionalize the third mission by supporting and promoting researchers' engagement with external stakeholders in alignment with institutional strategies. Due to the complexity and diversity of knowledge transfer activities, KTOs vary in their name, structure, and initiatives implemented (Cesaroni and Piccaluga, 2016).

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and support their complex and articulated activities (Huggins et al., 2008; Good et al., 2020). Such a challenging need is partly being addressed by specific associations that gather different actors, mainly KTOs from universities and PROs, to foster the exchange of knowledge and resources to support the valorization of research results, especially at the national level. In particular, these associations, which we define as knowledge exchange associations (KEAs), bring together KTO professionals and experts from universities and PROs to support their KTOs' activities, strengthen relationships among them and with companies and institutions outside, enhance national systems of innovation, generate scale effects in the volume of knowledge exchange activities, and create a national reference point to facilitate more global relations. Examples of KEAs include the Association of University Technology Managers (AUTM) in the US, which focuses on professional development, community building by organizing the largest annual conference on technology transfer worldwide, and the production of shared standards and benchmarks for technology transfer activities; the University Network for Innovation and Technology Transfer (UNITT) in Japan, which fosters coordination among universities and the dissemination of practices aligned with national innovation policies; RedOTRI in Spain, which operates in close connection with the university system and public authorities to support and structure knowledge transfer activities; and the Association of European Science and Technology Transfer Professionals (ASTP) at the European level, which functions as a transnational platform for training, professional exchange, and policy dialogue.[2] These associations share a common rationale of supporting KTOs in knowledge exchange and valorization, but they differ in their governance arrangements, organizational scope, and activity portfolios, reflecting the institutional and territorial contexts in which they are embedded.

Notwithstanding their relevance for practice (Morant, 2017), KEAs have received scant attention in the existing literature. In particular, existing studies have insufficiently examined the organizational tensions and strategic dilemmas that underpin KTOs' engagement with such associations over time (Watkins et al., 2015). Affiliation with KEAs requires KTOs (already confronted with multiple and competing demands; Battaglia et al., 2017) to commit time, resources, and coordination efforts to collective organizational forms whose benefits are uncertain and whose legitimacy may still be fragile. To address these tensions, the current paper aims to explore KEAs from the perspectives of their members (i.e., KTOs). In particular, we ask: *How does KTOs' engagement with KEAs evolve over time, and which mechanisms drive this evolution?* We believe that deep diving into the drivers that underpin such an engagement process and their dynamics can improve the understanding of these associations and their role over time.

To address this issue, we present the exemplary case of Netval, the Italian association that brings together KTOs from 65 Italian universities, 16 research centers, 16 research hospitals, and 7 other members. Founded in 2002 as an informal network of university KTOs, Netval became an association in 2007, and it opened its doors to non-university PROs a few years later. Its mission is to support and strengthen knowledge exchange and valorization processes by reinforcing the knowledge exchange culture in society at large.

Following similar research on other associations (Giudici et al., 2018), we adopted an inductive approach for this longitudinal and exploratory case study (Eisenhardt, 1989). KEAs represent the investigated phenomenon, but we specifically considered the single affiliates (i.e., KTOs) as the unit of analysis. KTOs, through their decisions and initiatives, guide and shape the association's evolution over time.

We collected data and conducted interviews with Netval's founders and associates, who represent different KTOs. To increase the granularity of our interview sample, we also included Netval's staff and policymakers collaborating with Netval to incorporate the perspectives of the association's internal and external main stakeholders. Moreover, we triangulated those primary sources with secondary ones.

We identified two main drivers for joining NETVAL and observed their evolution over time: building legitimacy and searching for learning. We analyzed and discussed the dynamics of these drivers and how they shape the evolution and growth of KEAs. Our core contribution lies in showing that legitimacy and learning do not remain equally relevant throughout the association's development, but they vary in their relative importance across different phases. We also demonstrate that, as their relative salience shifts, these drivers produce different effects on the KEA's identity, structure, priorities, and positioning. We present the managerial and policy implications for KTOs and KEAs, as well as a discussion of the limitations of our study.

2. Theoretical background

2.1. Role of knowledge exchange associations

We initially examine the role of KEAs in the literature on technology and knowledge sharing. Understanding this role requires grasping the factors that push KTOs to interact, invest in interorganizational relationships, and seek affiliation, as their changing expectations and relational needs shape the evolution of KEAs. In this context, KEAs play a relevant role in uniting and supporting intermediary organizations, mainly KTOs. These KTOs act as bridges between the scientific and technological knowledge generated within universities and PROs and the diverse stakeholders operating externally (Ambos et al., 2008; Villani et al., 2017; Clayton et al., 2018).

Research in management and organizational studies (e.g., Bennett, 2000) highlights that one of the primary objectives of associations is bringing together members (i.e., individuals or organizations) to foster the exchange of knowledge and resources while cultivating a collaborative environment (Teckchandani, 2014). Associations function in the common interests of their members by sharing resources, facilitating communication, and giving them bargaining power when interacting with the external environment (i.e., with media and policymakers; Rajwani et al., 2015). Through the centrality they often have in interorganizational networks (e.g., Saxenian, 1994), associations can also provide their members with the information, resources, and support needed to increase their social capital (Ibarra, 1997). Furthermore, associations permit the formation of a common culture around shared values and principles (e.g., Saxenian, 1994). Such embeddedness may lead members to work together toward certain objectives and use their combined knowledge to reduce task uncertainty (Greenwood et al., 2002).

Individuals and organizations join associations for various reasons that depend on a series of contextual factors (e.g., country and environmental dynamics). For example, in the case of KEAs, country specificities may play a role. In fact, in contexts with a strong tradition in technology and knowledge sharing (i.e., where such activities are considered key priorities by governments, which may provide coherent investments and normative support), KEAs mostly exist to provide visibility and credibility to their affiliates. Alternatively, when KEAs operate in contexts characterized by weaker national frames and scarce support, their role can be more oriented toward lobbying and advocacy activities (Kshetri and Dholakia, 2009; Arıkan and Schilling, 2010).

Regardless of their related activities, associations as KEAs can play an important role in improving socialization, diffusing national and international best practices, and enhancing learning through vertical training programs (Giudici et al., 2018). KEAs exercise political action through lobbying (Lawton et al., 2018), raising policymakers' awareness about removable barriers and contributing to the shared and accepted legitimacy of their members (Greenwood et al., 2002); KEAs also foster

[2] The differences across KEAs highlighted in the introduction have been extensively documented by ASTP in the "Handbook for a National Association in Knowledge Transfer". For reasons of space, we do not provide a detailed account of the specific goals and activities of each KEA. Details may be found in the reference list.

the professionalization of individuals within vertical career paths (i.e., the professional identity of KTO professionals; Kahl, 2014; Farndale and Brewster, 2005). Moreover, KEAs can strengthen national innovation systems by amplifying the scale and visibility of knowledge exchange activities, thereby fostering more coordinated efforts and enabling institutions to leverage their existing resources better (Lawton et al., 2018). KEAs can also serve as a central point of reference and help harmonize standards and practices across their members (Giudici et al., 2018).

KEAs are more likely to be established at the national level, as numerous local institutions already foster knowledge sharing at the local and regional levels (Giudici et al., 2018). This national orientation allows KEAs to interact with policymakers and governments when defining policies to support technology and knowledge sharing. KEAs also have the potential and reputation to build and represent a specific national identity for KTOs, reflecting the needs and expectations of their affiliated universities and PROs. Therefore, KEAs can be a unique entry gate to access and understand the field, as well as a point of reference for public policymakers.

Recent studies have recognized the role of KEAs in the context of technology and knowledge sharing; however, little attention has been paid to understanding why KTOs decide to join a KEA, and, in particular, what they look for, and how such drivers evolve. By examining the members' perspectives, we can improve the understanding of the determinants of KEAs' formation, their evolution, and their role in the knowledge-sharing context. To obtain better insights into the drivers of KTOs' affiliation with KEAs, we subsequently explore the determinants of interorganizational relations.

2.2. Interorganizational relationships and determinants of affiliation

Interorganizational relationships are defined as interactions between two or more organizations in their environment (Oliver, 1990), which enable firms to create value by combining resources, sharing knowledge, and achieving common objectives (Doz and Hamel, 1998; Hardy et al., 2003). Scholars have identified various factors influencing an organization's decision to establish such linkages (Oliver, 1990), many of which may interact and change over time. Below, we review the critical conditions underpinning the formation of interorganizational relationships (Oliver, 1990; Barringer and Harrison, 2000).

Efficiency determinants are a key driver of interorganizational relationships, particularly in response to market failures and the need to reduce transaction and operational costs. From the transaction cost perspective (Williamson, 1975, 1985, 1991), firms establish alliances to improve input/output processes and mitigate uncertainty, emphasizing efficiency as a core rationale of collaborations. Beyond efficiency, organizations form interorganizational relationships to increase competitiveness or market power (Barringer and Harrison, 2000). In conditions of resource scarcity, relationships can serve as a mechanism for increasing political influence, gaining access to critical resources, and reducing costs (e.g., Koh and Venkatraman, 1991).

In addition to economic and strategic reasons, a considerable proportion of the literature views reciprocity as a fundamental driver for forming relationships. Such literature (e.g., Freeman, 1994; Lando et al., 1997) underscores that organizations are cooperative systems and that relationships are formed to foster mutual collaboration and coordination. From this viewpoint, interorganizational relationships arise to pursue shared or mutually beneficial goals or interests.

The enhancement of organizational legitimacy is one of the most relevant drivers in the decision of organizations to interconnect. Institutional theory (e.g., DiMaggio and Powell, 1983; Madhavan et al., 1998; Dacin et al., 2007) suggests that organizations form relationships to conform to societal expectations and enhance legitimacy. For example, membership in an association might enhance a firm's reputation, image, and prestige or conformance to prevailing norms in the institutional environment (Oliver, 1990).

Still in the vein of the most relevant drivers to affiliate, the literature on interorganizational networks provides evidence that interorganizational relationships facilitate learning and capability development (Cropper et al., 2008). According to learning theory, organizations can acquire knowledge either through their own experience (Huber, 1996; Levitt and March, 1988) or externally from other organizations (Von Krogh et al., 2001). However, the mere existence of a network is insufficient to enable learning; rather, the social capital embedded within each organization facilitates knowledge transfer (Inkpen and Tsang, 2005). These knowledge flows extend beyond dyadic relationships to include broader network effects, which reflect the structure and strength of interfirm connections.

The drivers for forming interorganizational relationships depend on the type of member organizations, their past histories, previous networks, missions, strategies for the future, and the degree to which the participants are linked to each other (e.g., Carnevali, 2011; Esparza et al., 2014). Drivers also stem from a combination of different factors, expressing multiple contingencies that are likely to change over time and hence lead to the evolution of interorganizational relationships.

Particularly in the case of KTOs, the nature of interorganizational relations that these entities seek is very specific to their missions. In contrast to for-profit firms, KTOs in most cases do not enter interorganizational relationships to maximize their revenues or improve their competitive advantage (Weckowska, 2015). Many of these KTOs invest in interorganizational relationships to address the tension they experience between having a global ambition (their knowledge-sharing mission is without boundaries) and being rooted (and somehow constrained) within a specific and geographically limited local context (their universities and local territories; Flores et al., 2024). This tension generates a persistent challenge: KTOs aspire to draw inspiration from internationally successful models and emulate their practices, yet their actions are constrained by local institutional conditions, territorial characteristics, and ecosystem-specific factors. Furthermore, the mission of KTOs is linked to knowledge valorization, balancing academic logics with managerial and policy demands, and they often operate with limited resources and institutional recognition (Siegel et al., 2003).

KEAs represent an empirical setting where relational needs (i.e., building legitimacy and accessing learning opportunities) gain particular relevance; however, the existing literature on interorganizational relationships struggles to fully capture their distinctive dynamics. Most of the literature considers actors that are either profit-seeking firms or voluntary communities, implicitly or explicitly assuming relatively clear and pre-defined goals, internal and external stakeholders with well-defined roles and expectations, and a stable institutional context of reference (Oliver, 1990; Barringer and Harrison, 2000; Hardy et al., 2003). KTOs affiliated with KEAs depart from these assumptions: they operate in hybrid institutional spaces, pursue multiple and often non-quantifiable institutional objectives, and engage in collective initiatives whose value and the relevant actors involved are uncertain and difficult to assess *ex ante* (Weckowska, 2015; Cunningham and O'Reilly, 2018; Pohle et al., 2022).

Exploring the drivers that shape KEAs' engagement and their evolution over time allows us to uncover dynamics that differ from conventional interactions, clarifying how and why professional communities in emerging fields deliberatively decide to join collective action in the form of associations such as KEAs. Furthermore, prior research on intermediary organizations has largely adopted a static perspective, focusing on drivers or outcomes at a particular moment (Watkins et al., 2015; Villani et al., 2017; Alexandre et al., 2022), while paying limited attention to how these drivers emerge, change, and interact over time. Adopting an evolutionary approach is especially relevant in the context of KEAs, as these structures, by their nature, operate in an environment characterized by rapid technological change and ongoing regulatory and normative adjustments, which may affect their governance and mission. This delineation underscores the importance of further exploring the issue and adopting a process-oriented

approach that explicitly foregrounds temporality in the study of KEAs as a distinctive empirical reality of interorganizational relationships.

3. Methods

3.1. Research design

To understand the determinants that spur KTOs and other intermediary organizations to join KEAs and how such associations evolve over time, we conducted a longitudinal and exploratory case study (Eisenhardt, 1989). Our work represents a first attempt to conceptualize and explain an organizational phenomenon (i.e., KEAs). Therefore, we decided that such a qualitative research design would be best suited for this objective (De Massis and Kotlar, 2014).

Drawing upon the prescriptions of similar studies that investigated associations and their evolution (Giudici et al., 2018), we considered KEAs as the phenomenon of investigation and the affiliated KTOs as the unit of analysis. We built upon the idea that such associations are aggregations of organizations and that their evolution over time is therefore determined by the cumulative effect of affiliates' drivers, decisions, and initiatives undertaken over time.

We considered the case of the Italian KTO association Netval (i.e., Network for Research Valorization), which was founded in 2002 as an informal network and became an association in 2007. Netval currently includes 104 members for which it delivers three lines of action: (i) sharing and strengthening the competencies of universities and PROs in the field of research valorization; (ii) promoting the culture and best practices of technology and knowledge sharing by acting as an institutional interface and conduit with the business world; and (iii) supporting KTOs in their valorization and dissemination activities.

In terms of case selection, we chose Netval because it constitutes an exemplary case that meets the three bases of longevity, research access, and representativeness set by De Massis and Kotlar (2014). The first basis is the *longevity* of the KEA. Netval indeed represents the not-so-common case of a KTO association with 20 years of activities that can be "transparently observable" in terms of evolution over time (Pettigrew, 1990). Netval is among the oldest KTO associations in Europe (Morant, 2017), and it has consistently produced annual reports and documents that track its evolution. This aspect goes with the second basis, that is, *research access* (De Massis and Kotlar, 2014). In fact, publicly available reports and documents about Netval have been combined with extensive access to other secondary sources disclosed by our informants (e.g., internal documents and presentation slides), as well as primary sources, including interviews and direct observations. Overall, we had access to nearly 15 h of interviews and extremely detailed secondary sources (i.e., up to 3500 pages from 18 annual reports detailing the association's life). The combination of these sources provided an overview of the state of the KEA and the Italian context in terms of technology and knowledge sharing.

Finally, we selected Netval for its *representativeness*. Netval is representative of a unique setting, as the Italian technology and knowledge-sharing ecosystem experienced rapid growth in the past 20 years despite being a latecomer with respect to other countries (Cesaroni and Piccaluga, 2016). The speed of this transformation depended on both an internal push to restructure universities and PROs (Battaglia et al., 2017) and an external pull (using policy instruments) intended to enhance opportunities within the ecosystem and strengthen the entities operating in this domain (Micozzi et al., 2021). Netval was established in Italy during such a period of significant change. In 2001, the Italian legislature introduced the so-called "professor privilege," which nominally transferred all IP rights over academic research results from universities to their faculty members (Lissoni et al., 2013). Additionally, in 2011, the Ministry of University and Research introduced the Italian Research Quality Evaluation that applied to all universities (i.e., Valutazione della Qualità della Ricerca, VQR). This evaluation process prompted KTOs to address the growing importance of measuring and monitoring their "third mission" and technology transfer activities for the first time (Ancaiani et al., 2015).

Although a single case study may limit the transferability and replicability of our findings, it provides a great opportunity to deeply explore the phenomenon of interest, exposing its underpinning processes and practices (Flores et al., 2024). To reinforce the reliability of our findings, we iteratively updated our work through a continuous triangulation of primary and secondary data sources, aiming to reduce any retrospective interpretation bias (Yin, 2013). For example, whenever contrasting themes about the association's life, role, and organization emerged, we compared them with the information collected, such as annual reports or archival documents. Alternatively, whenever key events were mentioned, we reviewed videos, slides, and newspapers, focusing on these specific aspects.

Similar to other investigations into associations (e.g., Giudici et al., 2018), our longitudinal and exploratory case study is mostly inductive (Eisenhardt, 1989): we sought to elaborate existing theoretical insights rather than generate new theories. Leveraging the theoretical framework that emerged from our literature analysis, we worked to expand the understanding of how KTOs engage in KEAs.

3.2. Data collection

In the standard tradition of case studies, researchers mainly rely on qualitative data, but here we combine different data sources to enhance our data credibility (De Massis and Kotlar, 2014). Our study synthesizes primary and secondary data sources, which we organized in Table I according to the prescriptions of Cloutier and Ravasi (2021).

Between June and September 2023, we began the collection of secondary data via desk research and accessing documents from both the association itself and the associates we contacted beforehand. The data included annual reports, archival documents, press releases, slides, and videos. Table I describes both the nature and usage of these secondary sources.

Furthermore, we considered two types of primary sources (i.e., interviews and direct observations) and collected them over a period of four months. Between December 2023 and March 2024, we ran 18 interviews with 14 key informants. We initially selected interviewees through referrals and direct contacts made by two of the authors, who happen to know Netval particularly well owing to their research background. Our key informants included KEA's founders and late associates. According to standard practice (De Massis and Kotlar, 2014), we also interviewed a set of Netval's internal and external stakeholders (namely, association staff and policymakers) to validate the findings that emerged from the main group of informants and to increase the reliability of this study.

Two of the authors jointly conducted all the interviews. Each interview lasted between 45 and 80 min; we used the Microsoft Teams platform to conduct, record, and automatically transcribe the interviews. We built two different semi-structured interview protocols (see Appendix A): the first one for internal informants (i.e., the KEA's founders and associates) and the second for external informants (i.e., policymakers and Netval's stakeholders).

To corroborate and refine our primary data sources, we also collected direct observations by participating in the Netval Annual Conference (i.e., the association's three-day annual meeting) in October 2023 and its Winter School (i.e., a four-day training meeting) in February 2024. We took extensive notes during those events while participating as observers (i.e., without a specific research protocol). Through these observations, we could engage in more informal discussions with associates whom we had not encountered before, while also enhancing our understanding of how members concretely interpreted their participation in the association.

Recognizing that a longitudinal and exploratory case study of this type may be subject to retrospective bias, we followed the recommendations of De Massis and Kotlar (2014) to minimize this risk. First,

Table 1
Data sources description.

Primary sources		
Data source	**Type of data**	**Use in the analysis**
Interviews	**18 interviews with 14 key informants (December 2023 – March 2024)** *Founders*: i.e., Professor A (2, 120′), Professor B (former president) (2, 105′), Vice chancellor A (1, 60′), Vice chancellor B (1, 40′), KTO Manager A (president) (1, 60′). *Late Associates*: i.e., KTO manager B (2, 100′), KTO manager C (1, 35′), Professor C (2, 105′), Vice chancellor C (1, 45′). *Association Staff*: Staff member A (1, 30′), Staff member B (1, 45′), Staff member C (1, 45′) *Policymakers*: i.e., Policy maker A (1, 60′), Policy maker B (1, 40′). Questions regarded Netval's history, its contribution to the national innovation ecosystem, the drivers to join the association, the benefits from membership.	Gaining an initial understanding from members of the association. Identifying the key drivers and benefits of joining the association. Understanding the practices that underpin the key drivers and benefits of joining the association.
Direct observations	**Annual Conference (October 2023)** Participation in the 16th annual conference of the association as observers, taking notes on how the associates interact among themselves and making informal conversation with them. **Winter School (February 2024)** Participation in the 4th Winter School of the association as observers, taking notes on how the associates interact among themselves and making informal conversation with them.	Gaining further insights into how the association works and how affiliates relate to one another. Triangulating facts and observations that emerged from the interviews with respondents.
Secondary sources		
Data source	**Type of data**	**Use in the analysis**
Annual reports	**18 Annual reports, 2005–2023 (June – September 2023)** Reports describing the annual association activities and the Italian technology and knowledge share scenario (3537 pages).	Expanding our understanding of the association's life. Triangulating facts and observations that emerged from interviews with respondents and direct observations.
Archival documents	**Memorandum of Understanding, 2002 (June – September 2023)** First agreement of collaborations among public research organizations (3 pages). **Association charter, 2007 (June – September 2023)** Official charter that recognizes Netval as an association (16 pages)	Expanding our understanding about the establishment of the association and its overall evolution over time. Triangulating facts and observations that emerged from interviews with respondents and direct observations.
Press releases	**Newspapers' articles (June – September 2023)** 15 articles in national newspapers that refer to Netval's establishment or initiatives (17 pages). Two interviews with two of Netval's presidents on the association (5 pages)	Expanding our understanding about the establishment of the association and its overall evolution over time. Better understanding of the national technology and knowledge sharing context and its key events. Better understanding of the key activities of the association. Triangulating facts and observations that emerged from interviews with respondents and direct observations.
Slides	**Presentation slides (June – September 2023)** Nine decks of slides used as official documents to present the association and its activities (247 pages)	Expanding our understanding about the establishment of the association and its overall evolution over time. Triangulating facts and observations that emerged from interviews with respondents and direct observations.
Videos	**Videos about Netval (June – September 2023)** Twelve promotional videos retrieved online about the association, its affiliates and activities implemented throughout its life (40′ in total).	Triangulating facts and observations that emerged from interviews with respondents and direct observations.

we facilitated the recall of past events by asking the informants to examine and comment on archival documents (e.g., PowerPoint presentations or videos) while answering the points listed in our interview protocol. Our use of Microsoft Teams enabled the respondents to view the documents in real time. Second, we reduced any potential inaccuracies related to memory distortion by including "different and well-informed employees" who were representative of the eight boards of directors that operated the KEA. Having such a range of respondents helped us increase the variety of perspectives and thereby strengthen the reliability and accuracy of our findings.

3.3. Case analysis

Following the prescriptions of Dalpiaz et al. (2016), we iteratively conducted the data analysis. We adopted an inductive approach (Eisenhardt, 1989) wherein we sought to connect empirical observations to novel conceptual insights informed by the literature on determinants to join associations introduced in the theory part of the paper. In this manner, we built upon existing theoretical models by carefully relating them to our empirical evidence (Giudici et al., 2018). We hereby present the five steps of our research process.

First, we developed a case chronology in which we analyzed the key phases that characterized Netval's life by systematically reconstructing its history and timeline. We specifically identified three different phases that we describe in Table II: *aggregation* (2001–2007), *consolidation* (2008–2015), and *impact* (2016–*ongoing*). We briefly describe each phase, identify a set of activities that characterized the evolution of the association, and highlight the events that marked the evolution of technology transfer and knowledge sharing at the national level. Furthermore, to better comprehend the evolution of the technology and knowledge-sharing ecosystem, we schematized the number of Netval's affiliates per year and compared that with the total number of Italian KTOs (see Appendix B). This table has been pivotal in identifying these three different phases. From 2008 (i.e., the beginning of the *consolidation* phase), we observed a growth in the KEA after years of inertia in terms of new affiliations. By 2016 (i.e., the beginning of the *impact* phase), the number of affiliates finally exceeded the number of KTOs mapped in Italy. In other words, the association became increasingly attractive to not only "traditional" KTOs but also related institutions (i.e., public research infrastructure, knowledge and technology transfer foundations, and science parks), thereby fostering engagement with the overall ecosystem.

Second, after data collection, we analyzed both primary sources (i.e., semi-structured interviews and direct observations) and secondary ones (i.e., archival documents) through open coding. Primary sources played a predominant role in addressing the research question, as they provided rich, processual insights into KTOs' engagement with KEAs. Secondary sources were instead used to contextualize the empirical setting and corroborate the informants' perspectives, thus supporting triangulation. In this phase, we generated a large set of in-vivo codes that we gradually collapsed into first-order codes (i.e., mechanisms; Gioia et al., 2013). Third, we used words, phrases, and concepts related to specific meanings to capture the mechanisms that underpin KTOs' engagement with KEAs. To validate the informants' statements, we constantly compared our interpretations from the primary sources with the ones resulting from the secondary sources. Therefore, we open-coded a preliminary set of categories to understand the mechanisms behind KTOs' affiliation processes.

Table 2
Case chronology.

Phases	Description of the phases	Key association activities	Key events in the national knowledge and share context
Aggregation (2001-2007)	• Answering to specific informal invitations, university professors and administrative staff participate in meetings and start sharing their experiences. (*) • Awareness grows about the need to represent needs and ideas as a group rather than as individual organizations. After a few meetings, several university representatives decide to set up a network, which becomes a formal association after a few years. (*)	• The first informal meetings were motivated by the need to discuss the recent introduction of the professor's privilege law (2001). (*) • The first Memorandum of Understanding is signed among university technology and knowledge sharing delegates at an Italian University Rectors meeting (CRUI) in 2002. • The first Netval Annual Report is published (2004). • Netval officially becomes an association (2007).	• Introduction of the so-called professor's privilege (2001). • University KTOs in Italy grow from 4 to 36 (2001-2007).
Consolidation (2008-2015)	• After the establishment of the association, there is a need to consolidate it by boosting members' sense of belonging and improving their competences. (*) • With KTOs' role expanding in the ecosystem, many affiliates participate in courses, exchange best practices and become fully aware of the local/national dimensions of technology and knowledge share processes. (*) • The first international study and visit tours are organized.	• First Netval Summer School (2008). • First series of seminars involving researchers and practitioners in the field of technology and knowledge sharing all over the country (2008-2009). • Netval's participation in the European ASTP network (2009). • First mission of Netval associates in Silicon Valley (2014). • First Netval Winter School (2015).	• Introduction of the first national Research Quality Evaluation by the Italian Ministry of University and Research, with a focus on "third mission" activities (2011).
Impact (2016-*ongoing)*	• The association becomes increasingly recognized and influential in the national ecosystem, particularly with regard to technology and knowledge sharing. • The dialogue with policymakers intensifies to the point of collaborating in the design of policy instruments and contributing to the reform process of the technology transfer ecosystem. (*)	• Launch of *Knowledge Share*, an online platform for the commercialization of research-based inventions (2019). • Co-design of policies with the National Ministry for Economic Development to strengthen KTOs and transfer processes toward SMEs (2019) and to increase the technology/market readiness of research-based inventions (2020). • The COVID-19 pandemic forces a move to online training seminars; Netval launches the WE-WE Webinars (2020-2022). • First edition of the Master course on "IP Valorization for Knowledge Exchange & Impact" (2021), designed and co-organized by Netval.	• First national policy action to strengthen KTOs (2019). • First national Proof-of-Concept policy action (2020). • Abolition of the so-called professor's privilege (2023). (*)

All the information were derived from primary-sources; (*) indicates "supplemented with secondary sources".

Fourth, we conducted an additional analysis through axial coding that aligns with our chosen theoretical framework, progressing toward a more theory-driven explanation of our case. We iteratively compared our first-order codes (i.e., mechanisms) with theoretical insights that had emerged from prior research. This step led us to aggregate those codes into second-order themes (i.e., KTOs' drivers for affiliating with KEAs). We then aggregated them into the four dimensions. Table III schematizes this process, and selected quotes may be found in Appendix C. To further clarify the temporal dimension and the evolving nature of the phenomenon investigated, for each second-order theme, we specified whether our informants were referring to the aggregation, consolidation, or impact phase of our case chronology while speaking.

Fifth, we developed a process model to illustrate how the previously introduced dimensions influenced the association's evolution throughout the three phases (see Fig. 1). We focused on the linkages between our aggregate dimensions and the association's development phases, building a coherent process model to explain the determinants that drove KTOs to join the KEA. In line with standard practice (Giudici et al., 2018), we subjected our emerging interpretation to public scrutiny, and we maintained constant communication (via email) with the key informants we interviewed, asking them to discuss and challenge our process model.

4. Findings

We developed a case chronology (Table II) of the analyzed KEA, collapsing nearly 20 years of Netval's life into three phases that we expect to be largely transferable to other KEAs. Identifying those phases was pivotal in building the process model (see Fig. 1).

During our analysis, we observed that the development of the KEA (i.e., the unfolding of the three identified phases) was characterized by

Table 3
Data structure.

Empirical background	First-order codes (mechanisms)	Second-order themes (drivers)	Aggregated dimensions
Founders and early associates framing the 'professor privilege' regulation as unfair and outdated, using it as a catalyst to initiate collective discussion. (*) Early associates criticizing the government's choice to introduce the professor privilege, referring to it as "unfair" or "ineffective".	Catalyzing collective mobilization through the shared contestation of outdated regulation. Building collective identity around the critique of ineffective policy frameworks.	Shared concerns for regulations perceived as antiquated	Building inward legitimacy
KTO managers and staff describing feelings of isolation and emphasizing how initial meetings transformed individual struggles into a sense of belonging to an emerging community. Early associates claiming a strong sense of belonging to a cause through an association still in the making, using words such as "family", "community", and "friends".	Transforming individual isolation into collective identification through shared experiences. Fostering attachment to a common cause as a foundation for a sense of belonging.	Building a common sense of belonging through a specific cause	
Early and late associates highlighting the uniqueness of giving equal voice and space to KTOs' administrative staff, KTOs' managers, and Professors responsible for the technology and knowledge share activities of their respective PROs. (°) Early and late associates interpreting the KEA's inclusiveness as a source of legitimacy and cohesion.	Creating a context that gives equal voice to diverse professional roles and perspectives. Generating cohesion through inclusive representation.	Bringing together different stakeholders that would be unlikely to associate with each other	Building outward legitimacy
Early and late associates talking about the need to engage with national and European institutions dealing with the technology and knowledge share contexts to change regulations and implement new policy instruments. Description by associates and association staff about episodes of failure and success in the engagement with institutions and policymakers. (*)	Joining forces to act as a collective interlocutor in the policy domain. Building institutional relevance through sustained engagement and policy co-development.	Engaging with policymakers to improve the status of technology and knowledge share related activities and organizations in the country	
Description of episodes to explain how the best practices identification took place and was promoted inside the association in a period of uncertainty for the technology and knowledge share context. Late associates explaining the reason for entering the association to access the network, get in touch with others, and informally learn from them. Associates describing best practices exchanged among associates on how to deal with technology and knowledge sharing activities.	Facilitating peer-to-peer learning through informal knowledge exchanges. Building collective know-how by collecting dispersed practices.	Identifying and exchanging best practices in a technology and knowledge share context in the making	Searching for informal learning
Description of episodes in which "best in class" KTOs support newly developed ones with urgencies or emerging needs, also through informal channels. Late associates discussing the opportunity to join the association to learn from those peers perceived as the "best in class" through mentoring and informal advice. (*)	Enabling learning through relations with experienced peers. Strengthening association capacity through peer support and informal mentorship.	Learning from the best in class	
Early associates describing the importance of joining the association to contribute to the annual survey on the national KTOs and to access the reporting documents on the status of the Italian technology and knowledge sharing context. (*) KTO professionals' reflection upon the importance of participating in the annual survey, both	Generating a shared knowledge base through collective data collection and reporting. Positioning the association's collective contribution through a practical output.	Participating in the annual survey on the status of technology and knowledge share context in the country	

(*continued on next page*)

Table 3 (*continued*)

Empirical background	First-order codes (mechanisms)	Second-order themes (drivers)	Aggregated dimensions
as an informal learning tool and a way to legitimize their profession. Description of how the data collection process takes place and of the most useful outputs of the annual survey.			
Associates explaining that after the establishment of the technology and knowledge share national evaluation, the KEA represents one of the few spaces for formal confrontation with other practitioners on how to address the target required. Late associates framing affiliation as a way to align with emerging standards.	Facilitating collective alignment with emerging evaluation frameworks. Looking for a mediation between practitioners' knowledge and national requirements.	Willingness to comply towards technology and knowledge share national standards	Searching for formal learning
Associates recounting the co-development and active participation in seasonal schools and seminars, highlighting these as institutionalized opportunities for formal knowledge share (*) Description of episodes to explain the importance of these schools to have formal learning opportunities.	Transferring collective learning through structured training initiatives. Leveraging collective knowledge to sustain cohesion.	Pooling know-how through association schools and seminars	

All the data were derived from semi-structured interviews; (*) indicates "supplemented with secondary sources"; (°) indicates "supplemented with direct observations".

evolving drivers related to building legitimacy and searching for learning opportunities. In this section, we illustrate how these different drivers and their evolving nature can facilitate the evolution of a KEA. We defined a specific timeline for each phase, but some of the key activities that underpin each phase partially overlap. However, distinguishing those activities according to the proposed sequence—that is, aggregation phase (2001–2007), consolidation phase (2008–2015), and impact phase (2016–ongoing)—is still useful to clarify how the KEA evolved.

4.1. Building inward and outward legitimacy

In the empirical context of Netval, our observations uncovered two sets of drivers for the association's members: internal ones for building legitimacy among the KTOs and external ones for building legitimacy among the KTOs' institutions and with national policymakers. Below, we describe both of them in detail.

First, in the aggregation phase, the KTOs were initially activated by a driver that we define as a *shared concern for regulations perceived as antiquated*. As previously mentioned, the so-called "professor privilege" (Lissoni et al., 2013) was introduced in 2001 when KTOs were only beginning to emerge (before 2001, Italy counted only four KTOs). Archival sources, including newspaper commentaries and association reports, indicate that this regulation raised concerns for professionals working within their universities or PROs. It was simply not considered the best policy for growing Italy's technology and knowledge-sharing domain.

That event served as the catalyst for initial informal meetings among professors and university managers involved in knowledge transfer, who would later become the founders of the association. These meetings enabled the exchange of technical and managerial practices and discussions on the ways of strengthening KTOs' performance and influence within a largely indifferent institutional environment. At this stage, our respondents agreed that legitimacy was not about external recognition, but rather about constructing credibility (and mutual reassurance) within a professional community in the making that was still searching for its identity. As claimed by one of the professors we interviewed,

> That well-known measure (i.e., the "professor privilege") was just the last drop. The atmosphere was that they (i.e., "the legislators") talked about giving IP rights to professors because universities were not capable of managing them, and that it was therefore better for professors to directly talk to companies. […] This proposal sounded to many of us like a challenge, an insult, and something that was not true. While we agreed that Italian KTOs still had a lot to grow in this field, one of the professors (the delegate for technology and knowledge-sharing activities in a well-known Italian polytechnic) organized a first formal call for people involved in universities and PROs' technology and knowledge sharing to discuss and understand the situation together. (Professor B)

The first formal meeting held in 2001 involved representatives from a dozen entities. It was the first of several other occasions that led this small and committed set of practitioners and professors to start pondering the formalization of their meetings; they were therefore strongly motivated to *build a common sense of belonging through a specific cause*. Although the discussion surrounding the "professor privilege" initially brought them together, these meetings represented an invaluable opportunity for fellow professionals to connect and share their concerns and hopes for their growing field. As one of the respondents asserted,

> In those years, the profession of the KTO manager was emerging in Italy. Everyone was carrying out those activities individually in his or her own institution, but when we started networking, we understood that we were not alone in facing those problems. […] The idea of valorizing the research of universities and PROs toward the outside world was almost new and revolutionary; talking about it was almost taboo until a few years before. We believed we were part of something important, and we increasingly felt the need to make our demands heard and to speak with a more official voice. (KTO Manager B)

Additionally, more experienced KTOs started to share their knowledge with less experienced ones, which also strengthened the sense of community. Therefore, the group decided to develop a memorandum of understanding that was formally proposed to the delegates at a meeting of the Italian University Rectors Conferences (CRUI) in 2002. This protocol formalized an existent informal network. This passage from informal gatherings to formal protocols represents a key example of a first emerging tension: informality enabled mutual trust-building and knowledge exchange, but formalization was required in order to be perceived as legitimate by rectors and policymakers. In other words, the association had to balance internal community building with the external pressure to appear structured in a formal organizational form.

After a few years of joint activity, the KTOs' network transformed into a formally recognized association, garnering its first 27 affiliates in 2007. One respondent summarized the essence of those years:

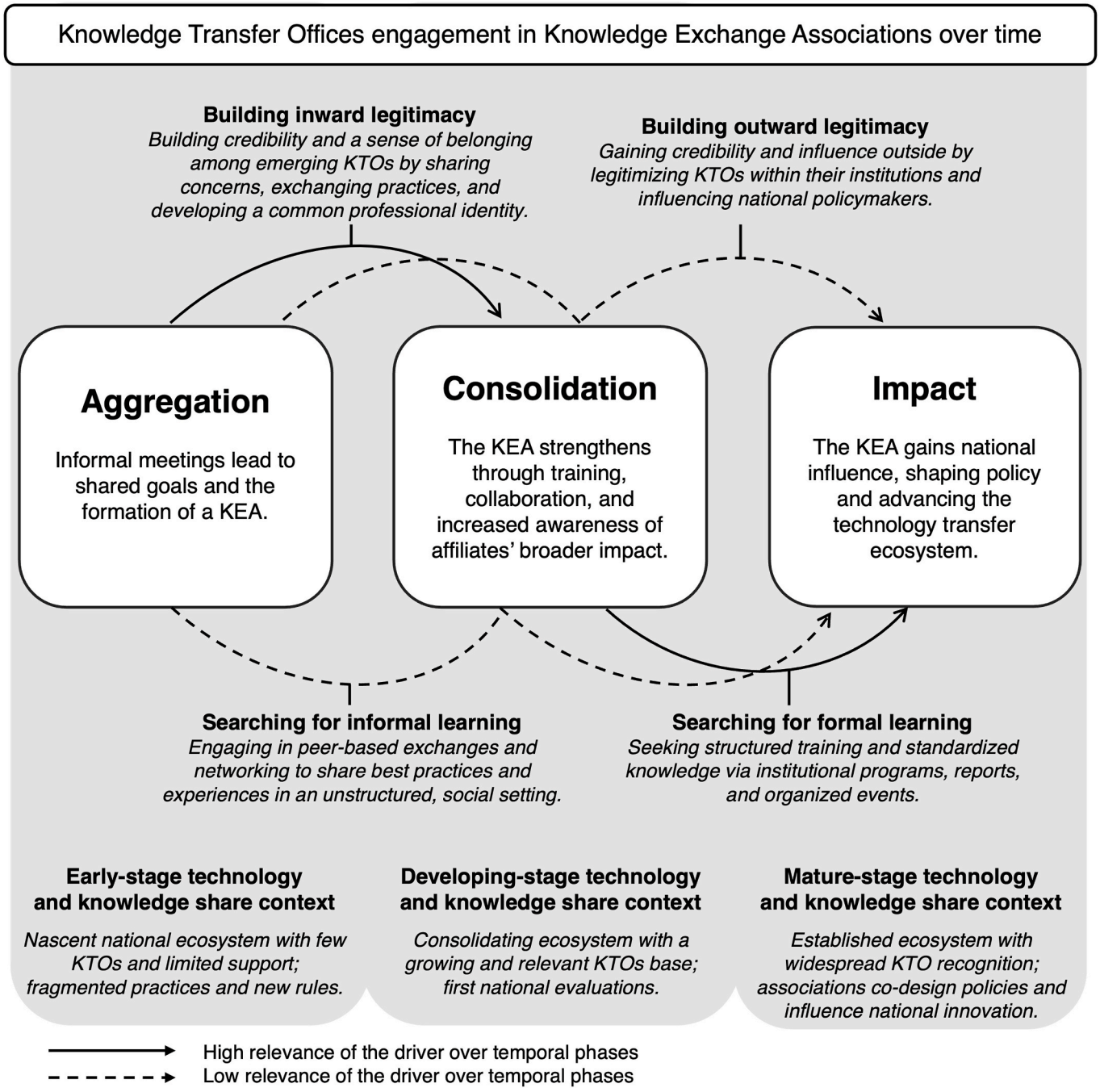


Fig. 1. Process model
Note that the solid and the dashed lines indicate the presence of a driver across temporal phases. Solid lines indicate that a driver retained high relevance between specific phases, whereas dashed lines indicate that its relevance was lower in those transitions.

> The participation fee was low, €1,500, and the association had to live on that. Thus, we are talking about a bottom–up initiative. This element has made the association not only very entrepreneurial but also highly autonomous and independent, with both a strong sense of public ethics and a spirit of autonomy and independence, as it was not financed by external bodies that potentially could have controlled and influenced us. (Vice Chancellor C)

At the outset, one of the key motives for the KEA was *bringing together different stakeholders.* Organizations (i.e., universities, through their KTOs) formally participated in the association, but they chose individuals to represent them, giving equal space and dignity to both professors (usually, the rector's delegate for technology and knowledge sharing or scholars in these research fields) and managers (typically, the head of the KTO). As one of the respondents underscored,

> This equal approach between the teaching and administrative components was unique and one of the main reasons that led many to affiliate. This complementarity motivated the participants and legitimized the association in the respective institutions to which the KTOs belong. (KTO Manager C)

This theme also distinctly emerged from our direct observations at the association's events (see Table I for reference). In both instances, we noted professors and managers engaging as equals, alternating roles in discussions and collaborating during informal moments, such as

networking breaks and social activities. These observations enhanced our understanding of affiliate interactions and supported triangulation with interview data. Throughout Netval's life, the co-presence of academic and administrative components has been recognized by our informants as a distinguishing feature of the KEA, both in representative and managerial activities, across the aggregation and consolidation phases. The association's voice consequently emerged as a synthesis of these perspectives, shaping the evolution of legitimacy: from demonstrating the existence of shared challenges among KTO professionals to integrating academic and managerial viewpoints into a coherent and credible collective representation. As KTO Manager B stated, *"What is at stake here goes beyond reciprocal* support*—it is the strategic acknowledgement that both components are fundamentally integral to the success of our mission."*

This characteristic is especially relevant between the consolidation and the impact phase because joining a KEA can allow KTOs to *engage with policymakers to improve the status of technology and knowledge-sharing-related activities and organizations in the country*. One of the recurring themes in the interviews and the secondary sources (i.e., mainly in the annual reports, presentation slides, and press releases) was how much Netval impacted the Italian innovation ecosystem. Over the years, Netval has assumed an increasingly pivotal role in not only facilitating networking among partners but also engaging with policymakers and institutions to foster national-level collaborative activities. As claimed by one of the vice chancellors we interviewed,

> Among the many collaborations fostered by Netval in those first years, there is one that greatly impacted our PRO. […] Our university is in a peripheral area in the South of Italy, traditionally perceived as less strategic than others. […] Through the network we built via Netval and the support of other KTOs, we were able to reach the capacity required to participate in national calls and policy programs that would have been difficult to access otherwise. For example, we built a collaborative incubator for spin-offs and several training programs to facilitate the market entry of doctoral students. (Vice Chancellor B)

Thus, over time, building legitimacy moved from being primarily "inward-looking" (i.e., building credibility and trust among peers) to being "outward-looking" (i.e., engaging policymakers and the overall national innovation ecosystem). This shift was not linear. In each phase, the association had to balance building a new community, addressing its members' needs, and fostering KEA's external impact. This process shows that legitimacy evolves over time.

4.2. Searching for informal and formal learning

While examining the affiliates' engagement with the KEA, we also observed a set of drivers related to the search for learning opportunities. What began as a search for informal learning opportunities in the aggregation phase evolved into the KTO creating formalized learning paths between the consolidation and the impact phase. This trajectory highlights a shift from spontaneous knowledge exchanges among peers toward increasingly structured and institutionalized learning dynamics, reflecting both the growing maturity of the community and the external pressures to professionalize the field.

According to our respondents, many of them chose to affiliate with the KEA in the aggregation phase to *identify and exchange best practices in an emerging technology and knowledge-sharing context*. Amid the early-stage development of the national technology and knowledge-sharing context (see for reference Table 2), the KEA provided KTO professionals with access to best practices and success stories on managing KTOs, promoting valorization activities, and addressing administrative requirements. This support was particularly important given the complexity and context-specific nature of research valorization processes. As claimed by a respondent who became affiliated in 2010,

> One of the most important benefits of the association was the continuous access to best practices, which has always been a key characteristic of Netval. […] This dissemination mostly transpired via informal channels. I remember to share and learn greatly in conversations before and after our events, at our social dinners, or in our association WhatsApp groups. (KTO Manager B)

Another important aspect related to this driver was the possibility of *learning from the best in class*. As a respondent shared during the interview,

> We were a small university, yet we were sitting at the table with managers and professors of the most successful universities and PROs in the field of knowledge transfer. This was something very useful that gave us a further reason to stay affiliated with Netval. We learned from the best in class, but no one taught us really; it was much more of a relationship between peers in which everyone brings something to the table and takes what is needed. (Vice Chancellor B)

This aspect also emerged in Netval's annual reports and presentation slides in which mentorship programs are presented, where large and experienced KTOs frequently disseminate the best practices toward smaller ones.

Additionally, we observed that KTOs' affiliation was linked to *participating in the annual survey on the status of technology and knowledge sharing in the country*. Since 2004, the association has published a yearly "Annual Technology and Knowledge Share Report" based on a survey launched among members and a few external parties. The annual report has gradually become the most complete source of data about technology and knowledge sharing in Italian universities and PROs.[3] The annual report is currently acknowledged not only as an important source of information for benchmarking purposes but also a symbolic document that demonstrates the KEA's capacity to collect and distribute non-trivial data among various stakeholders. As one staff member indicated,

> Participating in the annual report is a nice chance to learn from others. It helped our KTO in better understanding our positioning in this ecosystem and what could be our growth opportunities by following the steps of other better performing players. (Staff member C)

Although many of the respondents recognized this process as time-consuming, they all agreed upon the strategic importance of understanding the challenges and opportunities in this domain. Every year, the report collects insights and case studies from the associates about the emerging trends in technology and knowledge sharing, the assembly of which offers a timely instrument for KTO employees and researchers in this discipline.

Another key driver related to the learning dimension is the *willingness to comply with technology and knowledge sharing national standards*. In this context, a major event for Italian KTOs was the introduction of the national evaluation exercise for universities and PROs' "third mission activities." Some respondents claimed that their universities and PROs were already prepared to meet national indicators, whereas others emphasized Netval's role in helping them interpret requirements and complete evaluation tasks. This aspect marked a turning point, as affiliates had to reconcile established practices with top–down evaluation logics, generating tensions between bottom–up know-how and national standards. At the same time, this fostered peer learning and enabled KEA affiliates to actively contribute to shaping the evaluation framework in dialogue with national institutions.

> Joining Netval was a deliberate choice. We felt the need to bring our on-the-ground experience into the national policy debate. […] Being

[3] To illustrate the growth in the annual survey over time, the first edition in 2004 gathered 30 responses, whereas the most recent one in 2024 collected 75. All the surveys may be retrieved on Netval's website.

part of that network gave us both the platform and the legitimacy to meaningfully contribute to the shaping of evaluation frameworks. (Professor C)

Furthermore, one of the policymakers we interviewed stated,

The involvement of Netval affiliates among the experts to design the national "third mission" evaluation exercise was pivotal [in] systemizing the perspectives of practitioners and policymakers and in better writing the targets concerned in the valuation according to the language of both. (Policy maker A)

The final driver that emerged as the KEA matured was related to pooling know-how through association schools and seminars. Many respondents claimed to have joined the KEA to participate in a series of seasonal schools organized for the affiliates, which addressed practical needs and emerging trends. Learning occurred through both formal sessions and informal social exchanges. Each year, the annual reports covered a presentation of these schools and seminars with a focus on the topics addressed and the learning and social activities organized. One of the managers explained,

What I really like about Netval is that it is first and foremost a community that works together and really likes spending time together. Our seasonal schools, for example, see us engaged in an in-depth exploration of timely issues, of course; however, such involvement is chiefly an opportunity to exchange thoughts and best practices in an informal setting. (KTO Manager B)

Therefore, in parallel with the dimension of building legitimacy, the dimension of searching for learning opportunities also shifted over time from primarily informal exchanges of operational practices to more formal and structured training dynamics. Informal learning dynamics remained present throughout the life of the KEA; however, at a certain stage, the need to institutionalize these processes became evident. KTOs' drivers to engage with a KEA accordingly evolved from addressing operational problems and sharing experiences (which remain a key aspect from the very beginning) to accessing standardized training programs. Some respondents noted that this formalization partly reduced the spontaneity of earlier exchanges, revealing tensions between the benefits and costs of institutionalizing learning.

4.3. Process model

In this section, we highlight two core insights that represent the main findings of our study. First, the drivers of KTOs' engagement with KEAs vary over time, depending on both the maturity of the technology and knowledge-sharing context and the developmental stage of the KTOs themselves. In other words, the nature of the drivers is not static; instead it evolves in parallel with KTOs' organizational growth and changes in the external environment.

Second, KTOs engage with KEAs to build legitimacy through an iterative process that unfolds over time. In the early phase, affiliates primarily sought inward legitimacy, joining forces around shared concerns that contributed to shaping the KEA's identity. As the association consolidated, KTOs increasingly pursued outward legitimacy, strengthening the KEA's engagement with universities and national policymakers. Due to those growth and legitimization efforts, the KEA consolidated its position and began to have an impact at the national-policy level, as evidenced by activities through which Netval directly interacted with institutions and contributed to shaping the Italian ecosystem in support of technology and knowledge sharing (see Table 2). As one of the respondents indicated,

The capacity we have developed over the years now makes us a reliable partner for institutions that often look to us to collaborate on policy plans. […] There are many examples where our delegates sat at the tables of the various ministries to help develop the country's system. […] One of these instances is that, finally, after years of discussion, the law about the professor privilege has been abolished in Italy, which was also achieved through the hard work of our associates. (Professor A)

In parallel with the aforementioned drivers, we also observed the KTOs undertake an iterative process of searching for learning opportunities. In the early days, associates sought to identify and exchange best practices to understand and cope with their evolving external context, expecting to learn from other KTOs that were recognized as "best in class." As the association matured, however, the affiliates searched for more formal learning opportunities that would help them comply with national standards and pool know-how through training events and seminars.

Through our inductive approach, we were able to schematize our findings in a process model (Fig. 1). We believe this framework can improve the comprehension of how the KTOs' affiliation process with KEAs transpires, especially in technology and knowledge-sharing contexts that are still in their infancy.

Across the successive phases of the KEA's life, the KTOs converged to build legitimacy. However, as previously mentioned, the need to build legitimacy evolved over time as the KTOs pursued new targets. Between the aggregation and consolidation phases, newly established KTOs sought to jointly build inward legitimacy and thus oriented the KEA's identity around specific causes and concerns. Between the consolidation and impact phases, both experienced and newer KTOs aimed to achieve outward legitimacy by reaching a critical mass and engaging more systematically with external actors, including policymakers and related institutions. Outward legitimacy was already relevant in earlier phases, but its emphasis increased over time. A similar shift occurred in the learning dimension: early phases were characterized by the search for informal learning opportunities, whereas later phases involved a growing demand for more formalized learning mechanisms. Informal learning remained relevant but became balanced with more structured forms of collective learning.

5. Discussion and conclusions

With this paper, we investigated how KTOs' engagement with KEAs evolves over time and which mechanisms drive such evolution. We considered the specific case of Netval and its role as a KEA in supporting technology and knowledge sharing in a national context. Our study revealed the presence of two determinants (i.e., building legitimacy and searching for learning). These determinants are not static; instead they vary over time based on the maturity of the external context in which KTOs operate and on the maturity of the KTOs themselves. We schematized this evolution in a process model (Fig. 1) that encompasses an extensive data collection and an iterative triangulation between several primary and secondary sources (Table I). Below, we highlight the implications of our findings for both theory and practice.

5.1. Theoretical contributions

We contribute to the literature on interorganizational relationships by exploring how these relationships unfold and evolve over time within the context of technology transfer and knowledge sharing (Watkins et al., 2015; Villani et al., 2017; Alexandre et al., 2022). Our findings align with foundational studies in the field (Oliver, 1990; Lawrence, 1999), which highlight the contingencies affecting the creation of interorganizational ties and extend this body of work by offering new insights into the specific case of KEAs' formation through their affiliated KTOs.

First, the need to build legitimacy emerges as a key driver not only for KTOs in their decision to affiliate and remain affiliated but also for the evolution of KEAs themselves. Our study reveals that the necessity to build legitimacy assumes different nuances over time. Initially, KTOs joined the association to build internal legitimacy, motivated by shared

concerns about the regulatory environment and a desire to form a collective identity and a sense of belonging. Gaining internal legitimacy is essential for KTOs to effectively operate in ways that are perceived as desirable and appropriate (Ashforth and Gibbs, 1990; Zimmerman and Zeitz, 2002; Pfeffer and Salancik, 2015). In this regard, internal legitimacy might reduce resistance when KTOs advocate for commercialization activities and practices within the university (Jepperson, 1991; Colyvas and Jonsson, 2011). In the second phase, the focus shifts outward, as KTOs seek external legitimacy, which becomes particularly relevant in times of environmental uncertainty, such as following regulatory or normative changes (representing underlying conditions for the legitimacy evolution that we observe), when securing recognition and support from external stakeholders is essential. The search for external legitimacy also becomes critical as KTOs seek to increase their acceptance and role at a more national and global level.

Associations are crucial in identifying the evolution of legitimation instances and their drivers (Farndale and Brewster, 2005; Halliday, 1993; Lawton et al., 2018), thereby facilitating the diffusion and institutionalization of new practices or novel organizational forms within single members (Greenwood et al., 2002). For example, in the case of KEAs, affiliated organizations may encounter pressure from stakeholders who fear that technology and knowledge-sharing activities might negatively influence the general quality of research and excessively focus on market-oriented logic. At the same time, global trends toward entrepreneurial universities and increased academic engagement (Siegel and Wright, 2015; Perkmann et al., 2019) have encouraged universities and PROs to adopt a more proactive and innovative approach to technology and knowledge transfer. Meanwhile, the continuous funding cuts for public research systems in many countries have prompted universities and PROs to seek additional private resources, which requires them to embrace more entrepreneurial practices (Ambos et al., 2008). KEAs have a key role in identifying these drivers and in addressing KTOs' evolving legitimacy needs while helping to enhance credibility, navigating institutional pressures, and aligning with broader systemic transformations.

Second, we focus on the search for learning opportunities as another key driver in KTOs' decision to affiliate with KEAs. Our study sheds light on how the search for learning opportunities evolves over time, shaping in turn the evolution of the KEA. Specifically, KTOs initially join the association with a need for learning that is primarily informal. This process mostly occurs through individual-level interactions, for example, the casual exchange of practices and experiences among members. As the association matures and adopts more formalized organizational procedures, the learning process becomes more structured. This shift signals a growing driver among KTOs to be engaged with the KEA in pursuit of continuous and formalized learning opportunities to support their strategic objectives. This underscores the evolving role of KEAs from informal aggregators that facilitate early-stage knowledge exchange to structured organizations that provide targeted instruments and resources to foster the development and growth of their affiliates.

Associations have always been recognized as relevant in the learning process of their affiliates, providing formal and informal opportunities to exchange knowledge, share good practices, and enhance collective competencies (Kahl, 2014; Giudici et al., 2018). For example, in the case of KEAs, KTOs confront significant challenges in operating on a global scale to effectively valorize the knowledge produced, achieve growth, and gain recognition (Battaglia et al., 2017; Belitski et al., 2019; Micozzi et al., 2021). In this context, learning is central to the global development and long-term success of their technology and knowledge-sharing initiatives (Weckowska, 2015).

Overall, our study highlights that the successful existence of KEAs requires a dynamic ability to sense and capture the evolution of drivers of affiliates over the years, understand those drivers, and reconfigure themselves to address and anticipate these changes. Therefore, a genuinely new catalyst is not simply that legitimacy and learning matter for KTOs' engagement, but that their relative salience shifts across the KEA development phases and, in doing so, generates distinct consequences. In earlier phases, legitimacy concerns are more prominent in shaping collective identity and external recognition, whereas in later phases, learning becomes more central in driving formalization, capability development, and the strategic reorientation of the association. In other words, our study reframes legitimacy and learning as evolving drivers that do not simply precede KTOs' engagement but also continuously shape KEAs' organization and initiatives. As these drivers are characterized by different levels of intensity over time, they influence the association's identity and boundaries, the degree of formalization of its activities, and the capacity of its external influence, ultimately affecting how KTOs interact with internal and external stakeholders (e.g., universities and policymakers) and how they contribute to the broader innovation system. In this view, the KEA's effectiveness relies on its capacity to sustain this shifting equilibrium, aligning internal needs for legitimacy and learning with the requirements posed by the evolving institutional environment to which KTOs belong.

Finally, although KEAs represent a specific category of association, we believe that our findings on the evolution of the drivers of building legitimacy and searching for learning (and their drivers) could inform other settings and other associations exposed to environmental, legal, and institutional changes and expected to have a role in transferring good practices, favor the adoption of novel procedures, and help affiliates to address mandatory changes.

5.2. Managerial and policy implications

Our findings similarly have implications for KTOs' managers, as well as for people involved in managing universities' technology and knowledge-sharing activities (e.g., managers or delegates of the rector for such initiatives), and for KEAs themselves.

Our findings primarily suggest implications for individual KTOs that are willing to join KEAs. Our study sheds light on how aggregation into a KEA allows KTOs to operate within an interorganizational environment that may legitimize their activities and enhance their visibility, credibility, and influence. By affiliating with a collective structure, KTOs can access shared resources, peer learning opportunities, and a stronger collective voice when interacting with policymakers and stakeholders. In the early stages, this approach requires an active commitment to building trust, shared identity, and mutual support with other members. However, this investment pays off once the KEA matures by positioning the KTO not only as one of the many offices of a university or a PRO but also as a participant in a broader innovation ecosystem that can advocate for more favorable institutional conditions.

Second, our findings suggest implications for KEAs. KEAs should design their activities around delivering the value that their members are seeking. For instance, KEAs should invest in formal training programs, workshops, and seminars, and continuous professional development programs that address their affiliates' evolving needs. To ensure the relevance of those training programs, KTOs need to regularly assess their needs (stemming from both internal competencies and external trends) and then actively communicate such needs to their association. That communication is vital for helping KEAs not only respond to immediate regulatory and market pressures but also anticipate future trends and prepare their affiliates to proactively meet these challenges. At the same time, KEAs should be constantly alert to external and institutional as well as environmental changes to anticipate possible new ways to address (and foresee) their affiliates' evolving needs. Beyond the specific context studied, our findings may be transferable to other mission-driven and professional associations operating in hybrid institutional settings, where collective value creation hinges on balancing learning and legitimacy, as much as on their formalization over time. The process model developed provides guidance on how associations can adapt their structures and initiatives as their internal and institutional environments evolve.

Moreover, although the phase distinction and its narratives are related to a specific case, they may serve as a benchmark for understanding when associations become credible policy interlocutors, by highlighting the conditions under which they transition from inward-oriented coordination to outward-facing representation and policy engagement. In fact, for policymakers seeking to boost their local innovation ecosystem, our study explains the drivers that prompt organizations to join KEAs. With that knowledge, policymakers could develop a set of regulatory frameworks and incentives that can encourage KTOs to affiliate with KEAs. This undertaking would help create a supportive environment where KTOs can find legitimacy and the driver to more actively engage in technology and knowledge-sharing activities.

5.3. Limitations and future research directions

The explorative nature of this work clearly indicates that it is subject to some limitations that may open avenues for future research. The first limitation relates to the generalizability of our findings. Although we included a vast set of sources and informants from different organizations, they all came from a specific national context (Italy) and thus may be subject to contextual bias. We believe that this research should be replicated with KEAs from other national settings, with the aim of uncovering variances between different cases and contexts (e.g., based on the various levels of maturity of the innovation ecosystems of countries). Alternative settings are likely to lead to different KEAs, but we argue that cases where countries are playing catch up will undergo phases similar to the ones we described.

Second, this study considered the drivers that shaped the creation of KEAs, but we disregarded the organizational conditions that led to the establishment of these associations. Future research could explore the process of creating alignment between those drivers (and the individual goals, objectives, and expectations of each KTO) and the organizational conditions required to bring various actors together. At the same time, scholars could examine the governance of KEAs and attempt to link different governance models (e.g., more agency- or stewardship-based) to the success of these initiatives.

Another limitation is related to our study's exclusive focus on KTOs affiliated with Netval, the main KEA in Italy. Although such focus ensures consistency and comparability across cases, it may introduce a self-selection bias, as affiliated KTOs might already recognize the value of joining a KEA. However, in the Italian context, this limitation is mitigated by the near-universal coverage of Netval. In fact, the association covers nearly all the KTOs of public universities, and a significant number of PROs' KTOs are members. The remaining PROs are either not engaged in technology transfer or lacking in a formal KTO. As such, the possibility of including active, non-affiliated KTOs was extremely limited. Nonetheless, we acknowledge that future research conducted in countries where KEAs are less pervasive could provide a valuable comparative perspective and further validate our findings.

Finally, our qualitative study is primarily exploratory in nature. We are confident in the possibility that future scholars could build on our findings and invest in deductive research, fostering a bridge between qualitative insights and theory-testing approaches (Eisenhardt, 1989). Our process model may provide an important starting point for formulating hypotheses that can further challenge, refine, or expand our exploratory findings, which, by their nature, require additional validation and development.

CRediT authorship contribution statement

Rosa Grimaldi: Conceptualization, Formal analysis, Methodology, Supervision, Validation, Writing – original draft, Writing – review & editing. **Azzurra Meoli:** Conceptualization, Data curation, Formal analysis, Investigation, Visualization, Writing – original draft. **Andrea Piccaluga:** Conceptualization, Methodology, Supervision, Validation, Writing – original draft. **Giovanni Tolin:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Visualization, Writing – original draft.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Interview protocol

Protocol A: Internal/Netval informants

Background information

- Background information about the interviewee
- Role held within Netval (if among founders/participants) or, in general, reasons he/she came into contact with Netval (if among partners/stakeholders)

Netval case

- What are the reasons that led to the establishment of Netval? What were the early years of the association like?
- What is the role of Netval today within the Italian innovation ecosystem?
- Why participate in an association like Netval? How have those reasons to participate evolved over time?
- What are the other needs/factors that universities and PROs will encounter in the near future? What, from your perspective, has been the role of Netval in meeting these needs?
- What are the advantages of participating in an entity like Netval today?
- What is the difference between organizations that joined in the early days and those that have joined more recently? Have the motivations changed?
- What are the challenges for the Association's near future?
- How has Netval impacted the national technology transfer system at the policy level?
- What best practices has the Association implemented that members can benefit from?
- Is there any anecdote you would like to tell us that has not yet emerged about the topics covered?

Protocol B: External informants

Background information

- Background information about the interviewee

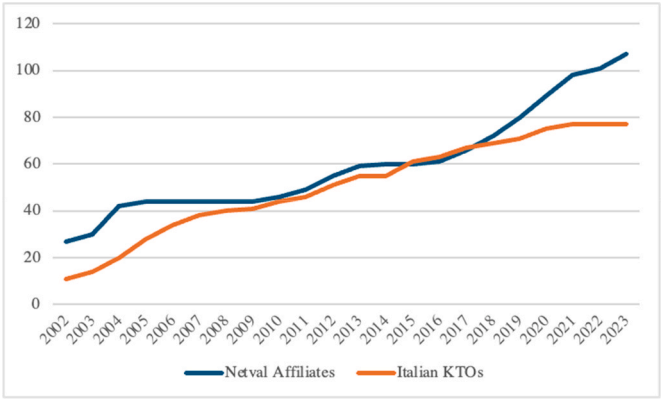
National technology and knowledge transfer context

- Could you please explain the main regulatory developments regarding the third mission evaluation of Italian universities and PROs? When did this development process start? What have been the most important changes over the years? When was the distribution of financial resources based on the VQR TM evaluation introduced?
- How have universities responded to these developments? What were their initial needs? What did they need to comply with the new regulations? What were the most important needs?
- What are the main motivations for universities and PROs to invest time and resources into third mission activities?

Netval case

- Why did they start affiliating with Netval?
- What other needs/motivations will universities experience in the near future?
- What, from your perspective, has been the role of Netval in addressing these needs to date? Are there additional reasons for universities to affiliate with Netval?

Appendix B. KEAs affiliates and KTOs evolution



All the data were derived from secondary sources (i.e., the 18 Annual reports published between 2005 and 2023).

Appendix C. Selected evidence

Aggregate dimension: BUILDING INWARD LEGITIMACY **Drivers**	**Selected evidence on first-order codes (mechanisms)**	**Related phases***
Shared concerns for regulations perceived as antiquated	*"When that [the professor's privilege] came out, many of us felt it was a step backwards. It gave the impression that universities weren't trusted to handle IP, and that was so frustrating. It really pushed us to sit down together and think about the next steps."* [KTO Manager A] *"The professor's privilege as a* norm *didn't make sense. It ignored all the efforts we were making to build proper KTOs and structures to support the knowledge transfer capacity of our institutions. For us, it became an initial spark to start talking and organizing."* *[Professor B]* *"I remember thinking: they just don't get what we're trying to do. That regulation made our work invisible. That's why we felt the need to come together and make our voice heard."* [Vice chancellor A]	Aggregation, Consolidation
Building a common sense of belonging through a specific cause	*"In those first meetings, I realized there were many of us who wanted to invest time and energy in building such a community, and it immediately created a sense of family."* [KTO Manager A] *"Those early gatherings gave us the feeling of being pioneers. It wasn't just about solving problems, not in immediate terms at least; it was about recognizing ourselves around a specific cause, […] as part of a community in the making."* [Professor A] *"The participation fee was low, EUR 1,500, and the association had to live on that. So, we are talking about a bottom-up initiative. This has made the association very entrepreneurial, but also very autonomous and independent, with a great sense of public ethics, but also with*	Aggregation, Consolidation

(*continued on next page*)

(*continued*)

	a spirit of autonomy and independence, since it was not financed by external bodies that potentially could have controlled and influenced us." [Vice Chancellor A]	
Aggregate dimension: BUILDING OUTWARD LEGITIMACY		
Drivers	**Selected evidence on first-order codes (mechanisms)**	**Related phases**
Bringing together different stakeholders who would be unlikely to associate with each other	*"What struck me from the start was that professors and managers sat at the same table from the very beginning. That balance gave weight to our discussions and made Netval credible back in our institutions."* [*Vice chancellor B]* *"Normally, academics and administrators don't mix much. In the early days of Netval, it was completely different (and it still is today): different parts of the organization had a voice. It made me feel the thought of the association was really shared between different stakeholders."* [KTO Manager A] *"Having both perspectives in the room (both the strategic and the operational) was key. It wasn't just symbolic; it created a sense of cohesion that kept us engaged."* [Professor B] *"Still nowadays, attending Netval assemblies, you can note professors, managers, and administrative staff engaging on equal footing during discussions and networking moments. This aspect more than others legitimizes us as a credible voice in our institutions and at the national level."* [Professor B]	Aggregation, Consolidation, Impact
Engaging with policymakers to improve the status of technology and knowledge share related activities and organizations in the country	*"Without a common voice, we had no chance to influence the rules. By engaging together with ministries and agencies, we started to be seen as real counterparts, not just isolated offices."* [KTO Manager B] *"Some meetings with policymakers were frustrating, but others opened doors. What mattered was being there as an association; it legitimized us to do something that the single institutions could never have had alone."* [Administrative Staff A] *"[…] Thanks to the network we built through Netval and the support of other KTOs, we were able to reach the capacity required to participate in national calls and policy programs that would have been difficult to access otherwise. For example, we built a collaborative incubator for spin-offs and several training programs to facilitate the market entry of doctoral students."* [Vice Chancellor B]	Consolidation, Impact
Aggregate dimension: SEARCHING FOR INFORMAL LEARNING		
Drivers	**Selected evidence on first-order codes (mechanisms)**	**Related phases**
Identifying and exchanging best practices in a technology and knowledge share context in the making	*"Honestly, the most useful tips came over coffee breaks or dinners. You'd hear how another office solved a problem, and you could try the same back home."* [KTO Manager A] *"For me, joining [the KEA] was about not reinventing the wheel. Talking with colleagues in the network gave us ready-made solutions to issues we were struggling with. I know you are well aware of our WhatsApp group, where we constantly exchange thoughts, problems, and solutions. Year after year, we built up a network from which all of us can benefit and learn."* [Vice chancellor C]	Aggregation, Consolidation, Impact
Learning from the best in class	*"As a newcomer, I felt quite lucky to sit next to people from bigger and better structured KTOs. Just listening to how they dealt with issues gave us perspectives that would have taken us to figure it out alone."* [KTO Manager B] *"Some of the bigger offices became our reference points. Whenever one of our members contacted us with an urgent doubt, there was always someone out there ready to give advice or point the colleague in the right direction."* [Staff member B]	Aggregation, Consolidation, Impact
Participating in the annual survey on the status of technology and knowledge share context in the country	*"Filling in the survey wasn't just a formality; it showed us where we stood compared to others, and that was a great way to see what we could become in the future."* [Vice chancellor C] *"The annual report quickly became a reference point in the national and European innovation ecosystem. It wasn't only about the numbers; it was concrete and tangible proof that our work mattered at the national level."* [Professor A] *"Participating in the annual report is a nice chance to learn from others. It helped our KTO in better understanding our positioning in this ecosystem and what could be our growth opportunities by following the steps of other better performing players."* [Staff member C]	Aggregation, Consolidation, Impact
Aggregate dimension: SEARCHING FOR FORMAL LEARNING		
Drivers	**Selected evidence on first-order codes (mechanisms)**	**Related phases**
Willingness to comply towards technology and knowledge share national standards	*"Many of the KTOs told us that being part of the association helped them understand what the standards really meant in practice. When the ANVUR [i.e., the national evaluation] started for the third mission initiatives, they all felt a bit lost. I think that by themselves, the whole process would have required much more time."* [Administrative Staff C] *"The evaluation rules pushed us to be more structured. The association gave us the chance to align and speak the same language with policymakers."* [KTO Manager A] *"The involvement of Netval affiliates among the experts to design the national "third mission" evaluation exercise was pivotal [in] systemizing the perspectives of practitioners and policymakers and in better writing the targets concerned in the valuation according to the language of both."* [Policy maker A]	Consolidation, Impact
Pooling know-how through association schools and seminars	*"The seasonal schools deeply changed us as an association for the better. They gave us structured training, but also plenty of time to discuss real cases with colleagues."* [Professor A] *"Every time I attended a school, I came back with practical tools we could apply right away in our office. It felt like continuous professional development."* [KTO manager B] *"What I really like about Netval is that it is first and foremost a community that works together and really likes spending time together. Our seasonal schools, for example, see us engaged in an in-depth exploration of timely issues, of course; however, such involvement is chiefly an opportunity to exchange thoughts and best practices in an informal setting."* [KTO Manager B].	Consolidation, Impact

* With the term "related phases," we indicate whether informants explicitly or implicitly referred to the aggregation, consolidation, or impact phases of our case chronology while speaking.

Data availability

Data will be made available on request.

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